

WHAT IS CLAIMED IS:

1. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated on the core substrate, wherein a cavity
5 is formed in the core substrate, and a plurality of capacitors are accommodated in the cavity.

2. A printed circuit board according to claim 1, wherein a resin is charged between the plurality of capacitors in the cavity, and the resin has a thermal
10 expansion coefficient smaller than a thermal expansion coefficient of the core substrate.

3. A printed circuit board according to claim 1 or 2, wherein penetrating openings are formed in the resin layer to form through holes.

15 4. A printed circuit board according to claim 1 or 2, wherein a metal film is formed on electrodes of the capacitor, and an electric connection for the electrodes formed with the metal film is established by plating.

20 5. A printed circuit board according to claim 4, wherein the metal film formed on the electrodes of the chip capacitor is a plated film including copper as a main component.

25 6. A printed circuit board according to claim 1 or 2, wherein at least a part of electrodes of each capacitor is uncoated with a coating layer and exposed to the outside, and an electric connection for the electrode exposed from the coating layer is established by plating.

30 7. A printed circuit board according to any one of claims 1 to 6, wherein a chip capacitor in which electrodes are formed along an inside of the outer edge thereof is used.

8. A printed circuit board according to any one of claims 1 to 8, wherein a chip capacitor in which electrodes are formed in matrix is used.

9. A printed circuit board according to any one of claims 1 to 8, wherein a capacitor is mounted on the surface of the printed circuit board.

10. A method for manufacturing a printed circuit board, comprising at least the following steps (a) to (c):

- 10 (a) forming a cavity in a core substrate;
- (b) mounting a plurality of capacitors in the cavity; and
- (c) charging a resin between the capacitors.

11. A method for manufacturing a printed circuit board according to claim 6, comprising, after the step (b), a step of applying a pressure to the upper surfaces of the plurality of capacitors in the cavity to align the upper surfaces of the capacitors to the same heights with each other.

12. A method for manufacturing a printed circuit board according to claim 6, comprising, after the step (c), -a step of forming penetrating openings in the resin layer to form through holes.

13. A method for manufacturing a printed circuit board comprising at least the following steps (a) to (c):

- 25 (a) forming penetrating openings in a resin material having a core material impregnated with a resin;
- (b) attaching a resin material to the resin material formed with the penetrating openings to form a core substrate having a cavity;
- 30 (c) mounting a plurality of capacitors in the cavity of the core substrate; and
- (d) charging a resin between the capacitors.

14. A method for manufacturing a printed circuit board according to claim 13, comprising, after the step (c), a step of applying a pressure to the upper surfaces of the plurality of capacitors in the cavity to align the upper surfaces of the capacitors to the same heights with each other.

15. A method for manufacturing a printed circuit board according to claim 13, comprising, after the step (d), a step of forming penetrating openings in the resin layer to form through holes.

16. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated on the core substrate,

wherein the core substrate incorporates a connection layer formed by an insulating resin layer including at least one or more layer, and an accommodation layer accommodating a capacitor in its spot-faced section.

17. A printed circuit board according to claim 16, wherein the accommodation layer incorporates a resin substrate having a core material impregnated with a resin, and the connection layer incorporates a resin substrate having no core material.

18. A printed circuit board according to claim 16 or 17, wherein the connection layer and the capacitor is connected to each other through a conductive adhesive.

19. A printed circuit board according to claim 18, wherein the core substrate has a circuit connected to the conductive adhesive between the connection layer and the accommodation layer.

20. A printed circuit board according to claim 17, wherein the IC chip provided on the surface of the printed circuit board is connected to the terminal of

the capacitor through the via holes formed in the connection layer, and

wherein the external substrate provided to the back surface of the printed circuit board is connected
5 to the terminal of the capacitor through the via holes and the through holes formed in the core substrate.

21. A printed circuit board according to any one of claims 16 to 20, wherein a plurality of the capacitors are accommodated, and a wiring for connecting the IC chip
10 to the external substrate is provided between the capacitors.

22. A printed circuit board according to any one of claims 16 to 21, a chip capacitor in which electrodes are formed along an inside of the outer edge thereof is
15 used.

23. A printed circuit board according to any one of claims 16 to 22, wherein a chip capacitor in which electrodes are formed in matrix is used.

24. A printed circuit board according to any one of claims 16 to 23, wherein a capacitor is mounted on
20 the surface of the printed circuit board.

25. A printed circuit board according to 24, wherein the chip capacitor mounted on the surface of the printed circuit board has an electrostatic capacity same
25 or larger than the electrostatic capacity of the chip capacitor incorporated in the printed circuit board.

26. A printed circuit board according to claim 24, wherein the chip capacitor mounted on the surface of the printed circuit board has an inductance same or
30 larger than the inductance of the chip capacitor incorporated in the printed circuit board.

27. A printed circuit board according to any one of claims 16 to 25, wherein a metal film is formed on

electrodes of the chip capacitor is a plated film including copper as a main component.

28. A printed circuit board according to any one of claims 16 to 26, wherein a resin having a thermal expansion coefficient smaller than the thermal expansion coefficient of the core substrate is charged between the spot-faced section of the core substrate and the chip capacitor.

29. A method for manufacturing a printed circuit board, comprising at least the following steps (a) to (c):

(a) forming a circuit pattern on a resin plate on its one side or both sides, and connecting a capacitor to the circuit pattern through an adhesive material;

(b) attaching a resin substrate formed with a cavity for accommodating the capacitor to the resin plate to form a core substrate; and

(c) forming openings extending to electrodes of the capacitor in the resin plate to form via holes.

30. A method for manufacturing a printed circuit board according to claim 29, wherein, in the attachment step of (c), a pressure is applied to the substrate from its both surfaces.

31. A method for manufacturing a printed circuit board according to claim 29 or 30, comprising, before or after the step of (c), a step of forming penetrating openings in the core substrate constituted by attaching the resin plate to the resin substrate to form through holes.

32. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein the core substrate incorporates a

connection layer formed by an insulating resin layer including at least one or more layer, and an accommodation layer formed by a resin layer accommodating a capacitor and including two or more layers.

5 33. A printed circuit board comprising a resin insulating layer and a conductor circuit laminated to the core substrate,

 wherein the core substrate incorporates a connection layer formed by an insulating resin layer including at least one or more layer, and an accommodation layer formed by a resin layer accommodating a capacitor and including two or more layers, and vias for establishing a connection with the capacitor are formed on both sides of the core substrate.

15 34. A printed circuit board according to claim 33, wherein the via holes formed in the core substrate are made of a metal film formed by one of methods selected from plating, sputtering, and deposition.

 35. A printed circuit board according to any one of claims 32 to 34, wherein the accommodation layer and the capacitor is bonded to each other by an insulating adhesive.

25 36. A printed circuit board according to any one of claims 32 to 35, wherein a plurality of the capacitors are accommodated, and a wiring for connecting an IC chip and an external substrate to each other is provided between the capacitors.

 37. A printed circuit board according to any one of claims 32 to 36, a chip capacitor in which electrodes are formed along an inside of the outer edge thereof is used.

30 38. A printed circuit board according to any one of claims 32 to 37, wherein a chip capacitor in which

electrodes are formed in matrix is used.

39. A printed circuit board according to any one of claims 32 to 38, wherein a capacitor is mounted on the surface of the printed circuit board.

5 40. A printed circuit board according to 39, wherein the chip capacitor mounted on the surface of the printed circuit board has an electrostatic capacity same or larger than the electrostatic capacity of the chip capacitor incorporated in the printed circuit board.

10 41. A printed circuit board according to claim 39, wherein the chip capacitor mounted on the surface of the printed circuit board has an inductance same or larger than the inductance of the chip capacitor incorporated in the printed circuit board.

15 42. A printed circuit board according to any one of claims 32 to 41, wherein a metal film is formed on electrodes of the chip capacitor, and an electric connection to the electrodes formed with the metal film is established by plating.

20 43. A printed circuit board according to any one of claim 42, wherein a metal film formed on electrodes of the chip capacitor is a plated film including copper as a main component.

25 44. A printed circuit board according to any one of claims 32 to 41, wherein at least a part of electrodes of each capacitor is uncoated with a coating layer and exposed to the outside, and an electric connection for the electrode exposed from the coating layer is established by plating.

30 45. A printed circuit board according to claim 35, wherein the insulating adhesive has a thermal expansion coefficient smaller than the thermal expansion coefficient of the accommodation layer.

46. A method for manufacturing a printed circuit board comprising at least the following steps (a) to (e):

5 (a) forming penetrating openings for accommodating a capacitor in a first resin material having a core material impregnated with a resin;

(b) attaching a second resin material to the first resin material formed with the penetrating openings to form an accommodation layer having a section for accommodating a capacitor;

10 (c) accommodating the capacitor in the accommodation layer;

(d) attaching a third insulating resin layer to the accommodation layer formed in the step (c) to form a core substrate; and

15 (e) forming openings extending to electrodes of the capacitor in the third insulating resin layer to form via holes.

47. A method for manufacturing a printed circuit board comprising at least the following steps (a) to (e):

20 (a) forming penetrating openings for accommodating a capacitor in a first resin material having a core material impregnated with a resin;

(b) providing a capacitor to the second resin material at a position corresponding to a section for accommodating a capacitor in the resin material;

25 (c) attaching the first resin material subjected to the step (a) and the second resin material subjected to the step (b) to each other to form an accommodation layer accommodating the capacitor;

30 (d) attaching a third insulating resin layer to the accommodation layer to form a core substrate; and

(e) forming openings in the third insulating resin layer extending to electrodes of the capacitor to form

via holes.

48. A method for manufacturing a printed circuit board comprising at least the following steps (a) to (f):

5 (a) forming penetrating openings for accommodating a capacitor in a first resin material having a core material impregnated with a resin;

(b) providing a capacitor to the second resin material at a position corresponding to a section for accommodating a capacitor in the resin material;

10 (c) attaching the first resin material subjected to the step (a) and the second resin material subjected to the step (b) to each other to form an accommodation layer accommodating the capacitor;

(d) attaching a third insulating resin layer to
15 the accommodation layer to form a core substrate;

(e) forming openings in the third insulating resin layer extending to electrodes of the capacitor to form via holes; and

(f) forming a conductive film in the penetrating
20 openings of the first resin material and the openings of the third resin material to form via holes.

49. A method for manufacturing a printed circuit board according to any one of claims 46 to 48, wherein, in the attachment step of (d), a pressure is applied to
25 the substrate from its both surfaces.

50. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein the core substrate incorporates an
30 accommodating layer having penetrating openings in each of which a capacitor is accommodated, and connection layers each made of an insulating resin layer and provided on the front surface and the back surface of the

accommodation layer.

51. A printed circuit board according to claim 50, wherein the accommodation layer incorporates a resin substrate having a core material impregnated with a resin,
5 and the connection layer incorporates a resin substrate having no core material.

52. A printed circuit board according to claim 50 or 51, wherein the capacitor is fixed in each of the penetrating openings of the accommodation layer through
10 an insulating adhesive.

53. A printed circuit board according to any one of claim 50 to 52, wherein the connection layers provided on the front surface and the back surface of the accommodation layer are provided with via holes for
15 connecting the connection layers to an IC chip and an external substrate.

54. A printed circuit board according to any one of claims 50 to 53, wherein a plurality of the capacitors are accommodated, and a wiring for connecting the IC chip
20 to the external substrate is provided between the capacitors.

55. A printed circuit board according to any one of claims 50 to 54, wherein a capacitor is mounted on the surface of the printed circuit board.

25 56. A printed circuit board according to 55, wherein the chip capacitor mounted on the surface of the printed circuit board has an electrostatic capacity same or larger than the electrostatic capacity of the chip capacitor incorporated in the printed circuit board.

30 57. A printed circuit board according to claim 55, wherein the chip capacitor mounted on the surface of the printed circuit board has an inductance same or larger than the inductance of the chip capacitor

incorporated in the printed circuit board.

58. A printed circuit board according to any one of claims 50 to 55, wherein a chip capacitor in which electrodes are formed along an inside of the outer edge thereof is used.

59. A printed circuit board according to any one of claims 50 to 55, wherein a chip capacitor in which electrodes are formed in matrix is used.

60. A printed circuit board according to any one of claims 50 to 59, wherein a metal film is formed on electrodes of the capacitor, and an electric connection for the electrode formed with the metal film is established by plating.

61. A printed circuit board according to claim 60, wherein the metal film formed on electrodes of the chip capacitor is a plated film including copper as a main component.

62. A printed circuit board according to any one of claims 50 to 58, wherein at least a part of electrodes of each capacitor is uncoated with a coating layer and exposed to the outside, and an electric connection for the electrode exposed from the coating layer is established by plating.

63. A printed circuit board according to claim 52, wherein the insulating adhesive has a thermal expansion coefficient smaller than the thermal expansion coefficient of the accommodation layer.

64. A method for manufacturing a printed circuit board comprising at least the following steps (a) to (d):

30 (a) forming penetrating openings for accommodating a capacitor in a first resin material having a core material impregnated with a resin;

(b) accommodating a capacitor in each of the

penetrating openings of the first resin material;

(c) attaching a second resin material to the first resin material to form a core substrate; and

(d) forming openings extending to electrodes of the capacitor in the second resin material of the core substrate to form via holes.

65. A method for manufacturing a printed circuit board according to claim 64, comprising, before or after the step (d), a step of forming penetrating openings on the core substrate to form through holes.

66. A method for manufacturing a printed circuit board according to claim 64 or 53, wherein, in the attachment step (c), a pressure is applied to the substrate from its both surfaces.

67. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein a capacitor is accommodated in the core substrate.

68. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein the chip capacitor is accommodated in the printed circuit board in the state where at least a part of electrodes of each capacitor is uncoated with a coating layer and exposed to the outside, and an electric connection for the electrode exposed from the coating layer is established by plating.

69. A printed circuit board according to claim 68, wherein the metal film formed on electrodes of the chip capacitor is a plated film including copper as a main component.

70. A printed circuit board comprising a core

substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein the chip capacitor is accommodated in the state where a metal film is formed on electrodes of the capacitor, and an electric connection for the electrodes formed with the metal film is established by plating.

71. A printed circuit board according to claim 70, wherein the metal film formed on electrodes of the chip capacitor is a plated film including copper as a main component.

72. A printed circuit board according to any one of claims 67 to 70, wherein a chip capacitor in which electrodes are formed along an inside of the outer edge thereof is used.

73. A printed circuit board according to any one of claims 67 to 72, wherein a chip capacitor in which electrodes are formed in matrix is used.

74. A printed circuit board according to any one of claims 67 to 73, wherein a plurality of chip capacitors from each of which a plurality of pieces are to be obtained are coupled into one-piece unit, and the one-piece unit is used.

75. A printed circuit board comprising a core substrate, and a resin insulating layer and a conductor circuit laminated to the core substrate,

wherein a capacitor is accommodated in the core substrate, and a capacitor is mounted on the surface of the printed circuit board.

76. A printed circuit board according to 75, wherein the chip capacitor mounted on the surface of the printed circuit board has an electrostatic capacity same or larger than the electrostatic capacity of the chip capacitor in the core substrate.

77. A printed circuit board according to claim 75, wherein the chip capacitor mounted on the surface of the printed circuit board has an inductance same or larger than the inductance of the chip capacitor incorporated in the printed circuit board.

78. A capacitor to be incorporated in a printed circuit board, wherein a copper plated film is coated on the surface of a metallized electrodes of a chip capacitor.

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